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Isolation, Identification, and Determination antimicrobial Susceptibility of Bacteria Isolated from Mobile Phones of Student

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ABSTRACT

In general from this study it can be concluded that the rate of bacterial contamination of mobile phone is height. A total of 25 samples were collected from the cell phones of the students of college of science biology department, Baghdad University. Bacteria encountered include: (gram positive; *S. aureus*, coagulase negative staphylococci (*S. peidermidis), S. Pyogenes*, *B. spp.)*, and gram negative; *E. coli*, and *P. aeruginosa*) most of these bacteria species are harmful and cause infection to humans. And in this study was found the percent of contamination in mobile phones of male (61.11%) more than in female (38.88%) mobile phones. The antibiotic sensitivity test showed the variety of resistance of isolated bacteria to antibiotics used in this study, but most isolated bacteria were sensitive to streptomycin and kanamycin except the isolates of *B. spp*. and *P. aeruginosa* were the most resistant bacteria for antibiotics used in this study approximately.

Introduction:

Today mobile phones have become one the indispensable accessories of professional and social life .The use of cell phones often occurs in hospitals, laboratories, etc. (2) Also mobile phones have become parts of health professional's equipment and are used extensively for Communication in clinical setting (1). Mobile phones can provide source of information of their owners: Sample data on their personal micro biome. The personal micro biome, here defined as the collection of microbes associated with an individual's personal effects (i.e., possessions regularly worn or carried on one's person) ,likely varies from person to person .Research has shown there can be significant variation in human micro biota, including for those microbe fond on the skin (6,7). Pathogen microorganisms can be spread through direct physical contact among people or through with contaminated inanimate objects and Surface. Numerous studies have demonstrated that the contaminated phones play a role in the spread of infectious disease (10) .

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Pathogenic bacteria can be present on the fomites can survive for a long of time depending on microbial characteristics, and environmental factor Such as relative air humidity and temperature (8).There are several from various countries regarding the role of mobile phones in transmission of hospital infections. But in these, bacteria such as coagulase negative *Staphylococci* that are normal flora of skin *Staphylococcus aureus, Klebseilla spps, E. coli ,pseudomonas* aeuroginosa ,and many other causing opportunistic infections such as *Bacillus* have been isolated (5).

The aims of this study were**:** Isolation and Identification of bacteria carried on the mobile phones of students. Determine antimicrobial resistance patterns. The isolates were assessed. Compare prevalence rates of isolated bacteria from the mobile phones of students by gender**.**

Materials and Methods:

Isolation and Identification:

A collection of 20 samples from (10 males, and 10 females).The Samples were collected from mobile phones of students in Biology department, Colleges of Science, University of Baghdad. The Samples were taken by sterile cotton swabs streaking on the keys of mobile phones and were at first inoculated in to Brain heart in fusion broth as transport medium, then

incubated at 37C° for 18-24 hrs. The samples cultured on this medium to increase the number of bacteria before isolation of them. Then cultured of loop full of bacteria on MaCconkey agar, Nutrient agar and incubated at 37°C for 18-24 hrs. The bacteria were identified by Microscopic examination to observe the shape and arrange of colonies, biochemical tests (4, 16); and all isolates maintained on nutrient broth containing 20% glycerol in deep
freeze. The identification was confirmed by API 20 E, and API staph system (BioMeriex).

Antibiotic Susceptibility test:

The sensitivity test of bacteria to antibiotics discs (bio analyses) (Cefotaxim 30 µg/ml, Gentamycin 10 µg/ml, Streptomycin 10 µg/ml, Ciproflaxacillin 5 µg/ml , Amoxicllin 10 µg/ml , Augmentin (Amoxicillin, Clvulanic acid) 30 µg/ml, Cefixim 10 µg/ml, and Kanamycin 30 µg/ml) was tested by method of (19). Results were interpreted after measuring the zone of inhibition and compared with standard inhibition zones (17).

Results and Discussion:

Isolation and Identification:

Out of 25 samples evaluated. Growth was observed in all samples (100%) of them were collected from mobile phones of students in Biology department, college of science, Baghdad University. Six genera bacteria were identified from cultures.

In a number of examined mobiles, one in some others more than one species of bacteria were found. And these genera in our study were gram positive bacteria: coagulase negative staphylococci (*Staphylococcus epidermidis*), *staphylococcus aureus*. *Streptococcus pyogenes*, and *Bacillus spp*.), and gram negative bacteria (*E. coli, Pseudomonas aeruginosa).* Gram positive bacteria percentage were (82.77%); and gram negative bacteria percentage were (17.33%) this showed in (Figure 1).

The most frequently bacteria were detected (cons) 10 isolates (34.5%), them *S. aureus* 6 isolates (20.7%), *B.* spp. 5 isolates (17.23%), and the *S. pyogenes* 3 isolates (10.34%). And *E. coli* 3 isolates (10.34%); *P. aeruginosa* 2 isolates (6.89%).The results showed in (table 1).

Compare prevalence rates of isolated bacteria by gender:

The percentage of prevalence rates of isolated bacteria from the mobile phones of students its by gender were 18 isolates (61.11%) more frequency in mobile phones of males than females were 11 isolates (38.88%), and the most frequent genus cons (*S. epidermidis*) in both gender at the same number 5 isolates (17.24%), *Bacillus* spp. were 5 isolates (17.24%) from male mobile phones, and 0 isolate (0.00%) from female mobile phone. While *S. aureus* bacteria from male mobile only (13.67%) 4 isolates compare with female mobile only 2 isolates (6.89%) and the percentage of *S. pyogenes* in mobile of females 2 isolates, (6.89%) and from male mobile 1 isolate (3.44%).And gram negative bacteria *E. coli* were 2(6.89%) and 1(3.44%) isolates in male ,female frequency. With the same number of *P. aeruginosa isolate* was 1(3.44%) in both gender, Showed in table (2)

Antibiotic Susceptibility test of isolated bacteria:

The isolated bacteria showed variable sensitivity patterns for different antibiotics tested. All isolated bacteria from four genera were resisting to Amoxicillin, Cefotaxim, Augmentin. The results indicated that *S. epidrmidis* isolates were sensitive to Streptomycin and Kanamycin, and resist to other resident antibiotic that used. The isolates of *S. aureus* sensitive to Streptomycin , Kanamycin, and resistant to Cefotaxim, Gentamycin , while the *S. pyogenes* isolates showed sensitivity to Gentamycin , Kanamycin, Ciprofloxacin, Cefixim and resist to Augmentin, Cefotaxim, Streptomycin , the genes *B. spp.* were resist to all antibiotics only sensitive to Gentamycin , and *E. coli* resist to Gentamycin,Cefotaxim, Ciprofloxacin, and sensitive to other antibiotics used in our study, and *P. aeruginosa* was sensitive to Ciprofloxacin only and resist to persist antibiotics used in this study.

Discussion:

Mobile phones are indispensable tools of communication, both at home and at work. They are always picked, dropped or pocketed, therefore has the potential of acquiring microbes from the handlers and the environment. Mobile phones as inanimate objects has been shown to possess the potential for survival of microorganisms some bacteria can survives for months, viruses such as corona, influenza can persist for few days ; and herpes virus can persist for a week (9,11).

The high rate of bacteria colonization mobile phones of students suggest their regular exposure to the bacteria in their environment, contact with surfaces infected materials, and the individual's level of personal hygiene may influence the rate of colonization(20).In our study high prevalence rate 100% this high prevalence might be because students deal more directly with aerosol created in laboratories and contact their mobile phones with the laboratory benches might account for the slightly high prevalence rate. And our study agree with another study was done in Yemen showed that percentage of contaminated mobile phones also 100%. As compared to the current study lower values were reported from Saudi Arabia

(43.6%) India (4.62%), turkey (61.3%) (1). When the types of organisms' isolation are considered, despite the difference in the isolation rate, most studies have reported similar type of organisms (15, 13). *S. aureus* were the most frequently isolated

organisms in those studies which is agree with our study because *Klebseilla* spp. ,and *Enterobacter*, *P. aeraginose*, *E.coli*, *Neisseria* spp were reported (14) in our study were isolated gram positive bacteria and gram negative bacteria and those results agree with other studies. Our results showed that the frequency of contamination mobile phones of male higher than in female. On the other hand the percentage Of frequency rate of isolated bacteria from mobile phones of medical personal by gender were male 15.6%, 7.6% female (3) in another study showed in female the percentage of contamination was more Was more than in male and this disagree with our study (12). May be in our study in male more than in female the percentage of contamination because most female keep their mobile phones in their hand bags protected from contamination. The possibility of the mobile phones of the male counterparts in the same professional harboring more bacteria are likely Because male always hold mobile phones in their palms, pocked or on tables or other surface from which they may acquires additional microbes. Antibiotic sensitivity testing of sample that had the highest frequency was performed by the disc diffusion for *B. spp* isolates were resist to the most antibiotic used in this study and the *S. aureus* and *S.epidermidis* (cons) in the same frequency rate of resistance to kanamycin (18) and this agree with our results. On the other study showed that *B. spp* also resist to all antibiotics that used may be because its forms spore and this reasons increase their resistance to antibiotics .Found *E .coli* in the mobile phone of students that's mean fecal contamination and poor hygiene for persons.While presence of *P. aeruginosa* in our study is very dangerous because these bacteria were resisting of many antiseptic and antibiotics, so caused many infection like: UTI, wound infection, RTI, etc.

References:

1. Ramesh j; carter A.O.; Campbell M.H.; etal (2008) use of mobile phones by medical staff at Queen Elizabeth hospital, Rarbados: evidence for both benefit and harm. Journal of hospital infection 70 (2): 160-165.
2. Karabay o.; kocoglu E.; tahtaci M. (2007). The role of mobile ohones in the spread of bacteria associated with nosocomial infections. j. infect developing countries. 1 (1): 72-73.
3. Amala S.E. and Ejikema I.F (2015). Bacteria associated with the mobile phones of medical personal. Am j. Biomed. Sci 7(1): 26-32.
4. Sepheri G.; talebizadeh N.; mirzazadeh A.; etal (2009). Bacterial contamination and resistance to commonly used antimicrobial of healthcare worker's mobile phones in teaching hospitals, kerman, iran. Am j. appl. Sci. 6(4): 543-547.
5. Holt, J.G.; krieg N.R.; smeath. P.H.A.; staley, J.T. and Williams S.T. (1994). Bergey's manual of determinative bacteriology. 9th ed Williams and wilkins. Baltimore, Maryland. 20 and 527-558.
6. Brooks G.F.; Butel J.S.; carroll. K.c. and morse, S.A. (2007). Medical microbiology. 24th ed. Mcgraw hill. London. 233-248.
7. Fierer N., hamady M., lauber cl., knight R. (2008). The influence of sex, handedness, and washing on the diversity at hand surface bacteria. Proceedings of the national academy of sciences of the United States of America. 105 (46): 17994-17999 doi 10.1073/ pnas. 0807g20105.
8. Grice EA. Korg HH., conlan S., deming CB.; Daris J. young DC., Bouffard GG. Etd. (2009). Topographical and temporal diversity at the human skin microbes. Science 324 (5931): 1190-1192 DoI 10.1126/science. 1171700.
9. Abad F.X. pinto R.M and Bosch A. (1994). Survival of Enteric virus on environmental fomites. Applied environmental microbiology 60 (10): 3704-3710.
10. Bardy R R., Wasson A., stirling I, Mc Allister C, Damani NN. (2006). is your phone bugged? The incidence of bacteria known to cause nosocomial infection on healthcare work's mobile phones. J. Hosp. Infect. 62: 123-125.
11. Kramer, A.; schwebine I and Kampf, G. (2006). The length of pathogens survival on Inanimate objects. A systematic review British medical council on infections disease. 6:130.
12. Rehab Rashed. (2010). The Contamination of mobile phone. Project research in Sana'a University.
13. Sadat-Ali M., Al-Omran A.k., Azam Q. etal. (2010). Bacterial flora on cell phone of health care providers in a teaching institution the American Journal of infection control, 38 (5): 464-405.
14. Aringemi k.o Atapu A.D., Adetona o.o, and Coker A.o. (2009). The Potential role of mobile phones in the spread of bacterial infections. Journal of Infection in Developing Countries 3 (8): 628-532.
15. Arora u., derip. Chadha A. and Malhotras. (2009) cell phones as modern stay honor for bacterial pathogens. Jk. Science. 11 (3): 127-129.
16. Morello., T. Mizer H. and Granato P. (2006). 8th ed. Laboratory and work Book in Microbiology. MCGraw Hill, London.
17. Brown A, E (2005) Microbiogical Application. 9th ed. MCGraw Hill. NewYork.

18. Schleifer, K. H.; Kloos, W. E. (1975). "Isolation and Characterization of Staphylococci from Human Skin I. Amended Descriptions of Staphylococcus epidermidis and Staphylococcus saprophyticus and Descriptions of Three New Species: Staphylococcus cohnii, Staphylococcus haemolyticus, and Staphylococcus xylosus". International Journal of Systematic Bacteriology 25 (1):50–61. doi:10.1099/00207713-25 150. ISSN 0020-7713.
19. Terrgan,M. and Pullian,L. 1982. Medical Microbiology laboratory procedure;W.B. Saunders company Londan.
20. Kluytmans J, van Belkum A, Verbrugh H; Van Belkum; Verbrugh (July 1997). "Nasal carriage of Staphylococcus aureus: epidemiology, underlying mechanisms, and associated risks". Clin. Microbiol. Rev. 10 (3): 50520. PMC 172932. . 9227864.

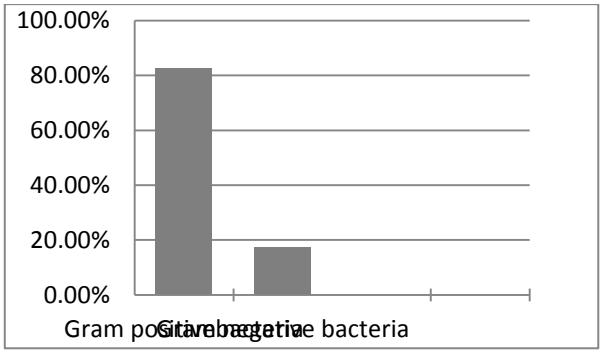

Figure (1): The percentage of bacteria isolated from student´s mobile phones

Table 1: number and percentage of isolated bacteria from mobile phones:

Bacteria	No. isolated	Percentage %
S. epidermidis(cons)	10	34.5%
S. aureus	6	20.7%
B. spp	5	17.23%
S. pyogcncs	3	10.34%
E. coli	3	10.34%
P. aeruginosa	2	6.89%
Total	29	100%

Table 2: the number and percentage of isolated bacteria from mobile phone by gender

Isolated bacteria	No. of isolates in male (%)	No. of isolates in female (%)
S. epidermidis(cons)	5 (17.24%)	5 (17.24%)
S. aureus	4 (13.79%)	2 (6.89%)
B. spp.	5 (17.24%)	0(0.00%)
S. pyogenes	1 (3.44%)	2 (6.89%)
E. coli	2(6.88)	1(3.44%)
P. aeruginosa	1(3.44%)	1(3.44%)
Total	18 (61.11)	11 (38.88)

عزل و تشخيص وتحديد الحساسية الضد المايكروبية للبكتريا المعزولة من الهواتف النقالة للطلاب

ايناس غسان سويدان

الخلاصة

ممكن ان نستنتج من هذه الدراسه بصوره عامه، ان معدل التلوث بالبكتريا عالي في الهواتف النقاله للطلاب .من مجموع 25 عينه تم جمعها من الهواتف النقالة للطلاب في قسم علوم الحياة، كلية العلوم، جامعة بغداد. البكتريا الموجوده تتضمن البكتريا الموجبه لصبغه غرام (*S. aureus*, *peidermidis), S. Pyogenes, B. spp*) و السالبه لها (*S.* coagulase negative staphylococci *E. coli*, *P. aeruginosa*) ; معظم هذه الأنواع البكتيريا مضرة وتسبب العدوى للإنسان.و وجد ان نسبة التلوث في الهواتف النقالة للذكور % ٦١.١١ اعلى منها في الاناث% ٣٨.٨٨.و اظهرت اختبارات الحساسيه اختلافا في مقاومة البكتريا المعزوله للمضادات الحياتية المستخدمه في الدراسة. لكن اغلب الانواع المعزوله كانت حساسه للستربتومايسين و الكانامايسين،ما عدا *P. aeruginosa, B. spp* كانت مقاومه لمعظم المضادات الحياتية المستخدمة في الدراسة تقريبا.